

machine with inductor-solenoid and continuous current, by M. Plücker.—Reports, &c.

No. 2.—Determinism and liberty; liberty demonstrated by mechanics, by M. Delbœuf.—On the origin of the Devonian limestones of Belgium, by M. Dewalque.—On the zircon of the quarries of Nil St. Vincent, by M. Renard.—On monochlorised chloride of acetyl, by M. Krutwig.—Influence of respiration on the circulation (fourth paper), by M. Fredericq.—Funeral discourses on M. Schwann and Col. Aden.—Reports, &c.

Archives des Sciences Physiques et Naturelles, March.—Influence of physico-chemical media on living beings; influence of different kinds of food on the development of the frog, by I. Yung.—Disinfections with sulphurous anhydride; siphonoid apparatus with special *transvasseur*; description of apparatus and management, by V. Fatio.—Swiss geological review for 1881 (continued), by E. Favre.

Revue d'Anthropologie, tome v., fasc. 1, 1882.—M. Paul Topinard's paper, on the weight of the brain, gives a comprehensive summary of all that had been done by Broca in this branch of craniology since the foundation of the mother-society at Paris, in 1861. Broca's tables, including upwards of 1000 of his own observations, were being revised by himself at the time of his death, and these, the further revision of which has been intrusted to M. Topinard, are given at length, together with his own emendations, from which he has been led to conclude that excessive weight of the brain cannot, *prima facie*, be accepted as an evidence of great intellectuality, but may fairly be assumed to depend upon some cerebral abnormality. Thus he is of opinion, that even in the case of Cuvier's brain, whose exceptionally large weight (1829 grammes) has long made it rank among cerebral marvels, the well-attested presence of hydrocephalus during the infancy of the great naturalist was not without influence on the subsequent cranial enlargement. Finally, he believes that we are justified in assuming that a well organised brain will not *very largely* exceed the mean, having due reference to age, sex, and stature. From Broca's tables we obtain a cerebral mean of 1325 for men generally, and of 1142 for women generally; the greatest weight among the former being attained between the ages of thirty and thirty-five, and among the latter, somewhat earlier. After the age of fifty-five, the diminution is rapid, and at the age of eighty it has reached the mean of 100 grammes, although the loss sometimes amounts to 250 grammes. The means for the prime of life are 1421 for men, and 1269 for women. In considering the data generally, it is essential to bear in mind that the individuals under observation were of necessity derived from the less favourable class supplied by asylums and hospitals; and, therefore, presenting generally traces of disease, more especially of the brain, La Salpêtrière and Bicêtre having yielded the greater number of the brains, commented on by Broca. The great desideratum of modern cerebral inquiry is the careful determination of the difference of the weight of the brain among mentally sound individuals belonging to the two distinct classes of those who are engaged in intellectual pursuits, and those whose vocations demand great muscular activity. Broca considered that form was more important than weight in estimating intellectual capacity, which possibly depends upon qualitative, and perhaps chemically inappreciable, rather than mere quantitative, relations.—M. Topinard, in a paper on the cephalic index, as determined according to Broca's method on the living subject, and after death explains the grounds on which he, in harmony with Prof. Vogt, has been led to consider as unnecessary and even erroneous, the reduction which it has hitherto been thought imperative to make, in order to bring the cephalometric estimate into complete accord with the craniometric determinations. He believes we ought to compare the two without making any reduction.—The capacity of the Black African races for becoming acclimatised, which is treated at great length by Dr. A. Corre, forms the subject of the only other original article in the *Revue*. The author, whose views are based upon observations made during many years residence in Senegal and other African inter-tropical regions, regards the African blacks as destined from the inherent inferiority of the race to give place in course of time to European immigrants. Beyond the possession of immunity against yellow fever and certain forms of marsh fever, he considers them to be inferior to whites in their powers of resistance against disease and general climatic conditions, and consequently inapt for military service, or for the purposes of colonisation, while finally he believes that the inaptitude of the negro for every high form of sociological development is such that there is only one of two

things to be anticipated in regard to the lands occupied by the black races, viz. that where the latter are the masters, barbarism will prevail, and that where they fall into subjection to civilised peoples, their numbers will gradually, but surely diminish, in spite of the more favourable conditions in which they will be placed.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, April 5.—J. W. Hulke, F.R.S., president, in the chair.—W. J. H. Mylne was elected a Fellow, and M. Alphonse Milne-Edwards, of Paris, a Foreign Correspondent of the Society.—Geological age of the Taconic system, by Prof. J. D. Dana, F.M.G.S. The author takes exception to some remarks made before the Geological Society by Dr. T. Sterry Hunt on November 16 last. Dr. Sterry Hunt has thrown doubt on the results arrived at by the geologists who have studied the relations of the so-called Taconic strata, not in consequence of any observations of his own, but on the general ground that "where newer strata are in unconformable contact with older ones, the effect of lateral movements of compression, involving the two series, is generally to cause the newer and more yielding strata to dip towards, and even beneath the edge of the older rock—a result due to folds, often with inversion, sometimes passing into faults." It was pointed out in opposition to these views, that the observations of Emmons, H. D. and W. B. Rogers, Mather, Sir W. Logan, James Hall, E. Hitchcock, C. H. Hitchcock, Hager, and Wing, prove that the Taconic schists and limestones are in conformable succession and of Silurian age. The stratigraphical structure of the Taconic range is, indeed, so simple that all observers who have studied it have described the schists and limestones as conformable; and numerous characteristic Silurian fossils have been found in both. This view had been maintained by Dr. Sterry Hunt himself till 1878, when he first propounded his new interpretation of the strata in question; but the latter was not based on any fresh facts or observations. The author's own observations on the subject, carried on during many years, were detailed and illustrated by a map of the whole of the Taconic range. In conclusion, he pointed out that, even if Dr. Sterry Hunt's general principle were conceded, and he was not by any means himself prepared to make such a concession, it would have no bearing on the point at issue; for the supposed younger strata do not dip against the Taconic schists. In opposition to the view that the geological age of strata can be inferred from their mineral characters, he pointed out what remarkably different rocks have been produced by the metamorphism, in different degrees, of the strata of the Taconic range.—On some Nodular Felsites in the Bala Group of North Wales, by Prof. T. G. Bonney, F.R.S.—On the Cambrian (Sedgw.) and Silurian rocks of Scandinavia, by J. E. Marr, B.A., F.G.S. The author has examined the following areas of Cambrian and Silurian rocks in Scandinavia:—(1) Dalecarlia, (2) Ostrogothia and Westrogothia, (3) Christiania, (4) Scania, (5) Baltic Isles. A sketch of the stratigraphy of each of these regions was given, and the author gave the following conclusions:—

Silurian.	Mudstones of Ramsåsa and Bjersjölagård	= Ludlow.
	<i>Cardiola</i> beds: <i>Cyrtograptus</i> and <i>Ketiolites</i> Shales	= Wenlock.
Silurian.	<i>Lobiferus</i> Shales: Upper part of Brachiopod beds	= May Hill
	Lower part of Brachiopod beds	= Upper Bala.
Cambrian.	<i>Trinucleus</i> Shales: <i>Beyrichii</i> Limestone	= Middle Bala.
	Kärgårde Shales: <i>Cystidean</i> Limestone	= Lower Bala.
	&c.	= &c.

A correlation with the beds of Bohemia was also given. The author pointed out that there is evidence of a physical break, varying in amount, as well as of a palæontological one between the Cambrian and Silurian of Scandinavia. Several of the beds of Scandinavia admit of a very exact parallel with strata in the English Lake district. The author considered that the fauna of these Scandinavian deposits affords evidence of migrations. This can be shown by observing that the same forms occur in two beds of different age, but are absent from an intermediate one; or by tracing beds laterally, and showing that the forms occur in an earlier deposit in one locality than in another. The author considered the black shales deep-water deposits, and accounted

for their wide extent by supposing the material derived directly from the decomposition of the felspar in metamorphic rocks, and so in a very fine state of division. The deep-water fauna in the Cambrian appears to have migrated from the south-west; the shallow-water forms, as might be expected, were more variable in their direction of migration: examples were given in support of this view. In Silurian times the direction of migration appears to have changed, the dispersal taking place from Britain, owing probably to greater local upheaval there. The coast-line also, instead of running in a west-north-west and east-south-east direction, seems to have run more west-south-west to east-north-east, as shallow-water forms are common in Britain, but deep-water forms in the central Swedish area. The result of the author's investigations, as bearing on classification, is that there is a break in Scandinavia at the base of the equivalents of the May Hill series, but no other break in the Cambrian series of Sedgwick of equal importance: no break, physical or paleontological, existing at the base of the *Ceratopgye*-limestone (Tremadoc), where some authors have drawn a boundary.

Zoological Society, April 18.—Prof. W. H. Flower, LL.D., F.R.S., president, in the chair.—Prof. Flower read a paper upon the mutual affinities of the animals composing the order Edentata, in which the usual binary division into *Phyllophaga* (or *Tardigrada*) and *Entomophaga* (or *Vermilingua*) was shown not to agree with the most important structural characters. These, according to the interpretation put upon them by the author, indicate that the *Bradypodidae* and *Megatheriidae* are allied to the *Myrmecophagidae*, and also, though less closely, to the *Dasypodidae*—all the American forms thus constituting one primary division of the order, from which both the *Manidae* and *Orycteropodidae* of the Old World are totally distinct.—A communication was read from Mr. Charles Darwin, F.R.S., introducing a paper by Dr. Van Dyck, of Beyrout, on the modification of a race of Syrian street dogs by means of natural selection.—Mr. Oldfield Thomas read an account of a small collection of mammals made by Mr. A. Forrer in the State of Durango, Central Mexico, in which examples of several northern forms, not hitherto recorded so far south, and several southern forms not hitherto known so far north, occurred.—A communication was read from Mr. Edward Bartlett, containing notes on a collection of mammals and birds formed by Mr. J. Hauxwell, in the neighbourhood of Nauta, Elvira, and Loretoyacu, on the Peruvian Amazons. The collection contained examples of new species of *Thamnophilus* and of *Crypturus*, which were proposed to be called *T. loretoyacuensis* and *C. balsomi*.—A communication was read from Mr. Edgar A. Smith, containing an account of the collections of terrestrial and fluviatile Mollusca lately made in Madagascar by Mr. W. Johnson and the Rev. W. Deans Cowan. Various new and interesting species of the genera *Cyclostoma*, *Vitrina*, *Helix*, *Stenogyra*, *Melanatria*, *Cleopatra*, *Ampullaria*, *Limnaea*, *Physa*, *Planorbis*, *Corbicula*, and *Pisidium* were described.

Meteorological Society, April 19.—Mr. J. K. Laughton, F.R.A.S., president, in the chair.—C. P. Bolton, J. Dale, Capt. G. Gaye, T. T. Marks, G. Neame, A. F. Osler, F.R.S., and Miss E. I. Pogson were balloted for, and duly elected Fellows of the Society.—The papers read were:—Barometric gradients—wind velocity and direction at the Kew Observatory, by G. M. Whipple, B.Sc., F.R.A.S., F.M.S., and T. W. Baker, F.M.S. For the purpose of investigating the subject of the relation of the force and direction of the wind to the distribution of barometric pressure, the authors have discussed the Kew observations for the five years 1875-79. The results show that the rate at which the wind flows increases almost directly with the inclination of the gradient in an arithmetical proportion, the mean rate of increase being 1.85 mile per hour for each additional .0025 inch of difference in the barometer readings at each end of the slope. The authors find that the angle at which the wind crosses the line of gradient at Kew does not vary with either the steepness of the gradient or the velocity of the wind to any material extent, and also that the angle is found generally to lie between 40° and 60°, the average of the whole series of observations giving a deviation of 52°—On difference of temperature with elevation, by George Dines, F.M.S. In this paper the author gives a summary of his observations made at Walton-on-Thames during the last six years. Two stands, almost identical in size and construction, were used, one being placed on the ground, and the other on the top of the tower of the house, the bulbs of the thermometers in the former being four feet, and in the latter fifty

feet above the ground. The results show that the average maximum temperature for every month is always greater, and the average minimum lower, on the ground than that on the tower.

Chemical Society, April 20.—Dr. Gilbert, president, in the chair.—The following papers were read:—On the atomic volume of iodine by Dr. Ramsay. The mean value obtained was 36.69.—On molecular volumes, by Dr. Ramsay. The author contrasts the relative probabilities of the antagonistic theories of Kopp and Schröder, and concludes that Schröder's hypothesis is untenable. The author has also determined the molecular volume of the group CH_2 at various pressures, and concludes that its value is less constant the higher the pressure; thus at 20 mm. pressure it varies from 17 to 21, at 30 atmospheres from 26.1 to 54.3.—On the action of acetone on phenanthraquinone, both alone and in the presence of ammonia, by Dr. F. R. Japp and F. W. Streatfield. A white crystalline substance is formed, $\text{C}_{17}\text{H}_{15}\text{NO}_2$, which melts with decomposition about 230°, and when dissolved in strong hydrochloric acid and diluted with much water, forms a crystalline substance, $\text{C}_{17}\text{H}_{14}\text{O}_3$, melting at 90°. By heating phenanthraquinone and acetone in sealed tubes to 200° this substance $\text{C}_{17}\text{H}_{14}\text{O}_3$ is also formed, and by passing ammonia through its ethereal solution the substance first described $\text{C}_{17}\text{H}_{15}\text{NO}_2$ can be prepared.—A study of some of the earth metals contained in samarskite, by H. E. Roscoe. The author has obtained, by crystallising a mixture of formates of terbium and yttrium, rhombic crystals exactly resembling the so-called formate of philippium. This supposed new metal, philippium, has therefore no existence.—On the spectrum of terbium, by H. E. Roscoe and A. Schuster.—On the action of thiophosphoryl chloride upon silver nitrate, by T. E. Thorpe and S. Dyson. The authors hoped to obtain a mixed anhydride resembling nitric anhydride in which some of the oxygen was replaced by sulphur, but no such substance was formed.—On the action of potassium amalgam, sulphuretted hydrogen, and potassic hydrate respectively on tetra- and pentathionate of potassium, by V. Lewes. Potassium amalgam and tetrathionite form hypophosphite, but if excess of alkali be present, some sulphide is produced; pentathionates furnish similar products.—On the action of zinc, magnesium, and iron as reducing agents with acidulated solutions of ferric salts, by T. E. Thorpe. The conditions for maximum reduction in the case of zinc are: concentration of the ferric salt, a small amount of free acid, and a rather high temperature. Magnesium acts much less efficiently than zinc. With iron a rise of temperature apparently decreases the reducing action.

Anthropological Institute, April 4.—Major-General Pitt-Rivers, F.R.S., president, in the chair.—The election of Everard F. im Thurn was announced.—The president exhibited a series of carvings and painted masks from New Ireland.—A paper on the Papuans and Polynesians was read by Mr. C. Staniland Wake, who, from a consideration of the physical peculiarities of the Oceanic Races, arrived at the following conclusions:—1. The Eastern Archipelago was at a very early period inhabited by a straight-haired race belonging to the so-called Caucasian stock, the present modern representatives of which are the Australians. 2. To this race belonged also ancestors of all the Oceanic races, including the Papuans, the Melanesians, the Micronesians, the Tasmanians, and the Polynesians, as shown by their common possession of certain physical characters. 3. The special peculiarities of the several dark races are due to the introduction of various foreign elements, the Negritos having influenced all of them in varying degrees. 4. The lighter Oceanic races show traces of the Negrito influence, but they have been affected at various periods by intermixture with peoples from the Asiatic area, giving rise on the one hand to the so-called "savage Malays," and on the other hand to the Polynesians, who have been specially affected by the Malays. 5. Traces of an Arab or Semitic element are apparent among both the dark and the light Oceanic races, but chiefly among the Papuans and Melanesians, the former of whom may also possibly possess a Hindoo admixture. Mr. C. P. Pfoundes read a paper on "Rites and Customs in Old Japan," and exhibited a number of photographs and Japanese books and pictures.

Entomological Society, April 5.—Mr. H. T. Stainton, F.R.S., president, in the chair.—Exhibitions: A box of *Hymenoptera*, mounted on glass, by Mr. J. R. Billups; a remarkable *Coccinella*, intermediate between *C. oblongoguttata* and

ocellata, by Rev. H. S. Gorham; and a very complete collection of British *Trichoptera*, by Mr. R. McLachlan.—Mr. A. G. Butler communicated a continuation of his *Heterocerous Lepidoptera*, collected in Chili by Mr. T. Edmonds, in which forty-five species of *Noctua* were noticed.

Victoria (Philosophical) Institute, April 17.—Dr. Wallich delivered a lecture describing the results of his investigations during the last twenty-two years into the question of the origin of life, his studies having led him to go over the ground that Prof. Haeckel has investigated.

BERLIN

Physiological Society, April 17.—M. du Bois-Reymond, president.—Dr. Schiffer lectured about the effects of guachamaka-poison. An extract was made from the wood of the poisonous plant, which, like curare, is soluble in water and alcohol, and gives the general reactions of an alkaloid. The effects of the extract were tried on frogs, pigeons, and rabbits. A latent period of about fifteen minutes was always noticed. This was followed by a loss of vital and motor powers, although the activity of the heart and of the organs of respiration was not impaired. When small doses were given, the animals recovered after a few days; when large doses were given, the impairment of their powers ended in producing death. The muscles could be stimulated directly, but not indirectly, through the medium of the nerves. The guachamaka-poison had, consequently, exactly the same effects as curare. The circumstance that both these poisons must be administered in 25 times as large quantities, when given by the mouth, than when administered hypodermically, gave origin to some attempts to discover the reason of this difference. It was determined that these poisons are neither very rapidly thrown out of the system in the urine, when they have been absorbed, nor are there substances present in the alimentary canal, which decompose them. The probable cause of the difference is, that these poisons are with difficulty absorbed from the stomach.—Dr. v. Ott read a communication about the formation of nutritive albumen in the digestive canal. A frog's heart, which had been rendered pulseless by washing it out with salt solution, and which commences to beat again under action of nutritive (*i.e.* serum) albumen, was used as a reagent, in order to recognise the presence of this albumen. Peptone had no action on the pulseless frog's heart, but the contents of the intestinal tube of a dog, who had been fed on albuminous food-stuff, had; consequently, serum-albumen must have been formed.—Prof. Adamkiewicz, of Krakau, gave a description of the anatomical alterations in a case of incipient tabes, and a description of the blood-vessels in the spinal cord, which form a very close capillary network. He believes that he can trace back tabes to a disease of the capillary vessels of the spinal cord.

PARIS

Academy of Sciences, April 17.—M. Jamin in the chair.—The following papers were read:—On the transformation of oxysulphide of carbon into ordinary and sulphurated ureas, by M. Berthelot.—Conservation of the hand by removal of bones of the carpus and radio-carpian resection, by M. Ollier. He has so operated in fifteen cases, and, after the first four, with very satisfactory results; the patients being able to use the hand in a light way, and several to do hard work with it.—Report on the photographic description of the Alps, by M. Civiale. This great enterprise is warmly eulogised by the Commission. M. Civiale selected forty-one panoramic centres, where he operated both as geodesian and photographer. In some cases he had to climb with his apparatus more than 3000 metres. At each station the apparatus was directed in fourteen equidistant azimuths, and the photographs were joined together. M. Civiale devotes 600 separate plates to details of the Alps, photographed at as many secondary stations. Full descriptions, containing much to interest the engineer and ordinary traveller, are given in his journal.—On quarantines at Suez, by M. Fauvel. He reviews at some length the prophylactic measures taken in recent years. M. de Lesseps seems to have been inadequately informed; what he proposes is exactly (M. Fauvel says) the ordinary practice at Suez; facilities as great as possible where the ship from a distance is really healthy; serious measures against every infected ship, or ship suspected of being so.—Method of observation of meteors at the summit of the Puy de Dôme, by M. Alluard. A circular terrace with balustrade has been formed round the tower; the balustrade is divided into 360° (N. 0°, E. 90°, &c.) and the localities all round

are referred to this graduation. Two terrestrial telescopes are supported on chariots running on rails round the terrace. Geographical maps are constructed, having concentric circumferences round the Puy de Dôme and radii from it. The origin and course of any meteor (thunderstorm, mist, &c.) is easily and exactly observed.—On spermatogenesis in plagiostomes and in amphibians, by M. Sabatier.—The death of M. Giffard was referred to.—Observations of planets 221, 222, 223, and 224, and of comet *a* 1882 (Wells) at Paris Observatory, by M. Bigourdan.—Elements and ephemerides of comet *a* 1882 (Wells) by the same.—Observations at Marseilles Observatory, by M. Coggia.—On the theory of uniform functions of a variable, by M. Mittag-Leffler.—On a property of the circle, by M. Darboux.—On a passage of the "Mecanique analytique," relative to the principle of the least action, by M. Brassinne.—On pernitric acid, by MM. Hautefeuille and Chappuis. On formation of pernitric acid by electrification of dry air, when the maximum tension for a given temperature has been reached, the electric discharges decompose the acid suddenly into hyponitric acid and oxygen (shown by sudden fall of pressure, and an intense red colour). A retrogradation of ozone takes place simultaneously, through heat liberated in decomposition of the acid. In presence of certain proportions of hyponitric acid neither ozone nor pernitric acid can be re-formed. To get as much pernitric acid as possible, one should operate at a low temperature; (other conditions are indicated).—On some reactions of salts of protoxide tin, by M. Ditte.—Action of ammoniac gas on nitrate of ammonia, by M. Raoult.—On the discovery of alkaloids derived from proteic animal matters, by M. Gautier. In 1873 he observed and announced that putrefaction of albuminoid matters gave rise to true fixed and volatile alkalies; (Selmi later).—On tetranitrate bromide of ethylene, by M. Villiers.—On the origin of saccharine matters in the plant, by M. Perrey. Cane-sugar is a product of direct elaboration of the green cells. Glucose, never found in the plant without saccharine, is probably derived from the latter by hydration. A reaction between saccharose and glucose, secondary in the leaf, primary in the seed, produces starch. In germination starch is transformed into dextrine and glucose. In normal nutrition saccharose appears with an essential rôle.—On the Echinida of the Senonian strata of Algeria, by M. Cotteau.—On the brain of *Arctocyon Duvallii* and of *Pleuraspidothierium Aumonieri*, mammalia of the lower eocene of the environs of Rheims, by M. Lemoine.—A "Traité d'Hydrographie," by M. Germain, was presented; also a volume by M. Pochet, entitled "Theory of the motion in curves on railways, with its applications to way and material; new method of ensuring the perfect working of axles in curves." M. Pochet expresses a hope that the State, which is about to construct no less than 14,000 to 15,000 km. of new lines within a few years, may take the initiative in fixing at the outset the elements of the typical railway, and that his theory may be of service for this.

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